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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,663	04/21/2004	Peter R. Hull	135830	4932

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EXAMINER
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KIM, TAE JUN

ART UNIT	PAPER NUMBER
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3746

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/828,663	<b>Applicant(s)</b> HULL ET AL.	
	<b>Examiner</b> Ted Kim	<b>Art Unit</b> 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 8-21 is/are pending in the application.
- 4a) Of the above claim(s) 11-14, 19-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-10, 15-18 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 8-10, 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Dyste et al (3,222,864). Dyste et al teach a gas turbine engine comprising: a compressor 30; a combustor 80 downstream from said compressor; a turbine 71 coupled in flow communication with said combustor; and a heat exchanger assembly comprising: an annular heat exchanger 14 coupled in flow communication to a compressor 30, said heat exchanger configured to channel compressor discharge air 70 to a combustor, said heat exchanger assembly coupled to said gas turbine engine such that said annular heat exchanger 14 is substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine; said heat exchanger comprising a plurality of heat exchanger elements (note that the aggregate of pipes 60 in the radial plane are aligned substantially perpendicular to a direction of exhaust flow discharged from the gas turbine engine). A heat exchanger assembly for a gas turbine engine, said heat exchanger assembly comprising: an annular heat exchanger 14 coupled in flow communication to a compressor, said heat exchanger configured to channel compressor discharge air to a combustor, said heat exchanger assembly coupled to said gas turbine engine such that

said heat exchanger is substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine; an outer casing 46 coupled to said heat exchanger and to a gas turbine rear frame 84 such that said annular heat exchanger is substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine; said plurality of heat exchange elements 60 aligned in an approximate sinusoidal arrangement (e.g. the outermost 60 in Fig. 2 is shown to be in an alternating fashion such that a sinusoidal curve can be drawn through them) extending around an inner periphery of an outer casing; further comprising: an inlet manifold (near 52) coupled in flow communication with said compressor; an outlet manifold (near 70) coupled in flow communication with said combustor; and wherein said heat exchanger comprises a plurality of heat exchanger elements 60, each said heat exchanger element comprising an inlet side in flow communication with said inlet manifold and an outlet side in flow communication with said outlet manifold; wherein said inlet manifold comprises a cross-sectional area that is inversely proportional to a cross-sectional area of said outlet manifold (note that the cross sectional area of the inlet and manifolds are in the same annular region of the engine and that as one of them gets bigger by inverse proportion the other is inherently smaller); a plug nozzle 94 fixedly secured to a gas turbine rear frame to facilitate controlling an amount of compressor air channeled through said heat exchanger.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8-10, 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zirin (3,201,938) in view of either Beam, Jr et al (3,386,243) or Dyste et al (3,222,864).

Zirin teaches a gas turbine engine comprising: a compressor 11; a combustor 12 downstream from said compressor; a turbine 13, 14 coupled in flow communication with said combustor; and a heat exchanger assembly 22 comprising: a heat exchanger 22 that appears to be annular (note that among other things manifolds 23, 24 are annular) coupled in flow communication to a compressor 11, said heat exchanger 22 configured to channel compressor discharge air 28 to a combustor, said heat exchanger assembly 22 coupled to said gas turbine engine such that said heat exchanger 22 is substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine; said heat exchanger comprising a plurality of heat exchanger elements aligned substantially perpendicular (the portion where element number 40 in Fig. 2 is located is in a location where the exhaust gas flows substantially perpendicular relative to the pipes – alternately note that heat exchange elements 47 are substantially perpendicular to the exhaust gas) to a direction of exhaust flow discharged from the gas turbine engine. A heat exchanger assembly 22 for a gas turbine engine, said heat exchanger assembly comprising: a heat

exchanger 22 that appears to be annular coupled in flow communication to a compressor, said heat exchanger configured to channel compressor discharge air 28 to a combustor, said heat exchanger assembly coupled to said gas turbine engine such that said heat exchanger is substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine; said plurality of heat exchange elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing; an outer casing 20 coupled to said heat exchanger and to a gas turbine rear frame such that said heat exchanger is substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine; said plurality of heat exchange elements 47 aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing; further comprising: an inlet manifold 24 coupled in flow communication with said compressor; an outlet manifold 23 coupled in flow communication with said combustor; and wherein said heat exchanger comprises a plurality of heat exchanger elements, each said heat exchanger element comprising an inlet side in flow communication with said inlet manifold 24 and an outlet side in flow communication with said outlet manifold 23; wherein said inlet manifold comprises a cross-sectional area that is inversely proportional to a cross-sectional area of said outlet manifold (note that the cross sectional area of the inlet and manifolds are in the same annular region of the engine and that as one of them gets bigger by inverse proportion the other is inherently smaller); a plug nozzle (see Fig. 5) fixedly secured to a gas turbine rear frame to facilitate controlling an amount of compressor air channeled through said heat exchanger. As

discussed above, it would appear that the heat exchanger is annular, but in order to obviate any doubt, Beam Jr et al and Dyste et al teach that making the heat exchanger annular. It would have been obvious to make the heat exchanger annular as a well known or conventional configuration utilized in the art.

5. Claims 8-10, 15-18, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the above applied art, and further in view of either Cook (2,925,714) or Moskowitz et al (3,735,588). The above applied art teach various aspects of the claimed invention but do not teach the use of fins substantially parallel to the direction of the exhaust flow discharged from the gas turbine engine. Cook teaches using fins 61 substantially parallel to the flow. Moskowitz et al teach using fins (Fig. 5) substantially parallel to the direction of the exhaust flow discharged from the gas turbine engine. It would have been obvious to one of ordinary skill in the art to employ fins, as taught by either Cook or Moskowitz et al, in order to increase the heat exchange efficiency. In an alternate interpretation by combining the fins with the heat exchange elements of the above applied prior art, the fins can be read on the plurality of heat exchange elements aligned substantially perpendicular to a direction of exhaust flow discharge from the gas turbine engine.

### ***Response to Arguments***

6. Applicant's arguments filed 02/21/2006 have been fully considered but they are not persuasive. Applicant's arguments are directed to new initiations that have been

introduced by the concomitant filed amendment. These new limitations have been fully treated above and the arguments are not persuasive as the claims do not distinguish over the art of record.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.




The fax numbers for the organization where this application is assigned are

571-273-8300 for Regular faxes and 571-273-8300 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Thorpe, can be reached at 571-272-4444.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861. General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>



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